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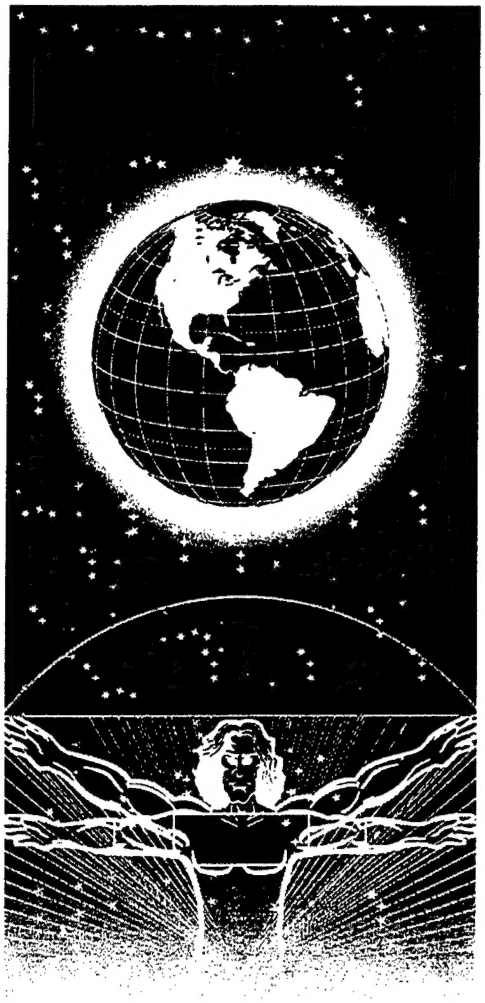

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Development of Bioavailability Adjustment Factors: A Feasibility Study

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December 2000

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The primary purpose of this effort is to investigate the feasibility of developing and using bioavailability adjustment factors to modify intake assumptions used in risk assessments on a site-specific basis. A survey was conducted for the Air Force Institute for Environment, Safety and Occupational Health Risk Analysis (AFIERA) to determine the policies of each state regarding the use of site-specific bioavailability data in conducting human health risk assessments. State regulatory agencies from each of the fifty states were contacted via electronic mail and/or telephone to request information on guidance documents used to determine the applicability of bioavailability considerations in risk assessment, the previous use of site-specific bioavailability adjustments, and the likelihood of state acceptability of bioavailability considerations in future risk assessments. Of the responses received, a majority of the states have no current written guidance on the use of bioavailability adjustments in risk assessment, nor any plans to generate guidance. While the majority of states indicated a willingness to consider bioavailability adjustments in future risk assessments, there is a lack of precedent in most states. We conclude that, while the use of bioavailability adjustment is a powerful tool in risk assessment, initial attempts to gain acceptance of the methodology by state regulators would require a significant effort due to a lack of accepted guidance.

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SECTION 1

PROJECT SCOPE AND BACKGROUND

1.1 SCOPE

This Scientific and Technical Report describes work accomplished under Delivery Order 56 for the Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis (AFIERA). The work described in this report follows the work plan to complete a feasibility study regarding the use of bioavailability adjustment factors in human health risk assessment. This work plan was presented in the Pretest Survey Report (PSR) submitted March 26, 2000. This technical narrative describes the approach to the work, the findings of the feasibility study, and conclusions and recommendations based on those findings.

1.2 BACKGROUND

The primary purpose of this effort was to investigate the feasibility of developing and using bioavailability adjustment factors to modify current remediation goals for soils. Bioavailability is the fraction of an applied dose of a chemical or environmental contaminant that reaches the blood, whether from the gastrointestinal tract, skin, or lungs. For the purposes of this project, emphasis was given to bioavailability from the gastrointestinal tract.

The results of two separate tasks are presented in this report. The first task was a literature review of the analytical techniques used to estimate the desorption of chemicals from soils in the stomach. The findings of this literature review are summarized in this document. Criteria for ranking the techniques were also developed. A discussion of the top-ranking techniques, their merits and drawbacks, the associated costs, and a list of all references were prepared.

The second task was a survey of state and United States Environmental Protection Agency (USEPA) regulators to determine past use of bioavailability adjustment factors in their state or region, including the success of such arguments and the likelihood of such arguments being accepted in the future. Where bioavailability factors have been used in a risk assessment in the past, a discussion of these "success stories" is included.

1.3 SCIENTIFIC AND TECHNICAL REPORT (STR) OVERVIEW

This STR comprises four sections and four attachments. Section 1 provides the general project scope and project background. Section 2 provides the results of the literature review. The results of the state survey are presented in Section 3, and Section 4 provides the cited references for the STR.

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SECTION 2

LITERATURE REVIEW

2.1 INTRODUCTION

This document describes an investigation into the feasibility of developing and using bioavailability adjustment factors to modify current remediation goals for soils. Bioavailability is defined as the fraction of an applied dose of a chemical or environmental contaminant that reaches the blood, whether from the gastrointestinal tract, skin, or lungs. In this report, emphasis is given to bioavailability from the gastrointestinal tract.

This document is intended to complement and not repeat information that was provided in two recent reports [1, 2]. Specific issues addressed in this document are a review of the available *in vitro* and *in vivo* methods along with an evaluation of their relative efficacy and cost.

2.2 METHODS

The initial step in the preparation of this report was the conduct of several literature searches. This was accomplished by a number of on-line database searches. The initial search was conducted on the Medline database for years 1985 and forward using the keywords: bioavailability and soils. This resulted in 122 abstracts being identified that were possibly relevant to this effort. The next search was conducted on the Toxline database for years 1985 and forward using the keywords: bioavailability, soils, and oral. This resulted in an additional 49 abstracts determined to possibly be relevant. It should be noted that the addition of the "oral" search criteria was added to the Toxline search (verses the Medline search) in order to focus the results and assure the relevance of the outcome for purposes of this report.

Finally, an additional search was conducted in an attempt to capture literature outside the realm of the two databases discussed above. Specifically, this search was directed toward the agricultural industry and included 280 additional databases with a variety of date ranges. These databases are listed in Attachment A. This search resulted in the identification of 80 additional possibly relevant abstracts using the keywords: bioavailability, chemical, soil, and oral.

The results of these literature searches were then reviewed by title or abstract to determine if the information presented would be relevant to this effort. Overall, the results of the literature search were disappointing in that little information could be found

which was directly relevant to this report and outside the realm of information presented in the two reports mentioned above [1, 2].

In an attempt to determine the relative costs of some of the techniques used to determine bioavailability, an informal phone survey was conducted. A list of exhibitors at the March 2000 Society of Toxicology (SOT) convention conference meeting was downloaded from the SOT website (www.sot.org) and the organizations known to be toxicity testing laboratories were contacted. This effort was unsuccessful in identifying any commercial laboratory that routinely conducts either *in vitro* or *in vivo* bioavailability assays. However, three academic institutions were identified that could perform the tests on a contract basis.

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The following section discusses a summary of the results and relevant findings from the evaluation of the literature and other activities discussed above.

2.3 DISCUSSION

There are numerous methods for estimating the oral absorption of chemicals from a soil matrix. Although it is not the intent of this paper to review each of these methods (see 1,2), Table 2.1 summarizes some of the *in vivo* and *in vitro* techniques along with their relative strengths and limitations [3].

Table 2.1 Comparison of Methods to Study Oral Bioavailability[a]

General Method	Objective	Technique	Strengths	Limitations
In vivo	Bioavailability Factor	Measurement of Blood Level	Accurate Reliable	Inconvenient
In vivo	Bioavailability Factor	Measurement of Urinary Level	Simple Convenient Inexpensive Rapid	Underestimation Unreliable
In vivo	Bioavailability Factor	Mass-Balance	Accurate Reliable	Technically demanding Expensive Time-Consuming
In vivo	Dissolution rate	Various	Simple Inexpensive Rapid	Not accurate Unreliable
In vivo	Bioavailability Factor	Measurement of Fecal Level	Simple Convenient	Overestimation Unreliable
In vivo	Bioavailability Factor	Chronic Isolated Loop	Controlling variables Remaining physiological function	Overestimation Unreliable
In vivo	Bioavailability Factor	Measurement of Liver Ratio	Direct measure of factor	Assumes chemicals concentrations in liver representative of systemic levels
In vitro	Dissolution rate	Various	Simple Inexpensive Rapid	Not accurate Unreliable
In vitro	Partition coefficient in GI tract	Various	Simple Inexpensive Rapid	Not accurate

a. Table 1 adapted from reference #3.

These methods encompass a diverse set of methods, endpoints, and utility. Although most of these techniques have limited applications, the literature review indicated some correlation between recent studies. Tables 2.2 and 2.3 summarize the methodology, model, and endpoints used in some of the recent studies.

Table 2.2 Examples of Recent Oral Bioavailability Studies – *In Vivo*

Chemical	Animal Model	Tissue Collected	Analytical	Ref.
Arsenic	New Zealand White Rabbit	Feces, Urine	AAS	4
Lead	Fischer 344 Rat	Blood, Bone, Liver	ICP-MS	5
PAHs	Lewis Rat	Blood, Feces, Urine	Metabolite detection	6
Cadmium	Lewis Rat	Blood, Urine, Liver, Kidney, Heart, Brain	AAS	7
Mercury	Swiss Mice	Feces	Cold Vapor Technique	8
Lead	Human	Feces	Radiological Tracer	9
PAHs	B6C3F1 Mice	Urine	Metabolite detection	10
Lead, Arsenic	New Zealand White Rabbit	Gastric Fluid	AAS	11
Arsenic	Wistar Rats	Blood	ICP-MS	12
Arsenic	Immature Swine	Urine	ICP-HG	13
Arsenic	Non-human Primate	Not Reported	Not Reported	14

AAS = Atomic Absorption Spectroscopy
ICP-MS = Inductively Coupled Plasma – Mass Spectrometry
ICP-HG = Inductively Coupled Plasma – utilizing Hydride Generation

Table 2.3 Examples of Recent Oral Bioavailability Studies – *In Vitro*

Chemical	*In Vitro* Method	Analytical	Ref.
PAHs	Dissolution under simulated rabbit gastric extraction conditions.	AAS	10
Lead	Dissolution under simulated rabbit gastric extraction conditions.	AAS	15
PAHs	Dissolution under simulated rabbit gastric extraction conditions.	AAS	16
Cadmium	Dissolution under simulated swine gastric extraction conditions.	ICP-HG	13

AAS = Atomic Absorption Spectroscopy
ICP-HG = Inductively Coupled Plasma – utilizing Hydride Generation

The relative number of recent studies found using the techniques in Tables 2.2 and 2.3 compared to some of the other study techniques listed in Table 2.1 may be a useful indicator of which studies might have a higher probability of acceptance by a regulatory agency. In general, the *in vivo* studies are conducted in mammalian models and the *in vitro* studies are dissolution studies which are designed to mimic the gastric conditions of the mammalian model of interest.

Several factors should be considered when determining the most appropriate test to conduct. One consideration is the acceptability of the data. At the time this report was prepared, the USEPA was not accepting *in vitro* study results as valid data for adjusting bioavailability factors. However some states such as Illinois, Michigan, Oklahoma, California, and Massachusetts have accepted *in vitro* study data to adjust for bioavailability [17].

Another consideration is the purpose for the bioavailability information. For instance, if the information is intended to be used to adjust a toxicity factor, then it would be prudent to use an animal model similar to the animal used in the study from which the toxicity factor was derived. If the information is to be used to determine bioavailability in humans, then a non-human primate may be more appropriate.

Consideration should also be given to the characteristics of the chemical being studied, technical limitations such as analytical detection limits, and nontechnical issues such as financial and time constraints [1]. For instance, organic compounds present a more complicated and more expensive undertaking than inorganics due to the lack of current bioavailability data and the necessity of determining which chemical species (i.e., the parent or a metabolite) to analyze. Some organic compounds such as PCBs and dioxins require significant initial pilot study before conducting definitive studies since available data are so sparse. Another consideration is an *in vitro* study. Although the USEPA is

not currently accepting *in vitro* studies to support adjustment of bioavailability factors, these studies can be quite useful in helping to design and evaluate the results of *in vivo* studies.

Availability of the laboratory and cost are other important aspects to consider before conducting a bioavailability study. Table 2.4 shows estimated costs of conducting some of these studies. These costs are based on single soil samples for an inorganic constituent. Cost of the studies for organic constituent would be significantly higher due to added analytical costs.

Table 2.4 Representative Costs for Conducting Bioavailability Studies[a]

Study System	Approximate Cost[17]
In vivo Swine	~$35,000 - $48,000
In vivo Non-human Primate	~$60,000
In vivo Rodent	$6,000 - $10,000
In vitro Dissolution	$100 - $1500

a. Costs estimates will be confirmed and refined for final document

2.4 CONCLUSIONS AND RECOMMENDATIONS

Before conducting a bioavailability study or studies several factors should be considered: feasibility of gathering information that may be useful in helping to reduce the time or costs associated with a remedial activity; relative costs of doing a bioavailability study verses the potential for remedial costs reduction; probability of acceptance of the study information by the regulatory agency; availability of suitable technology, laboratory space and personnel; and the characteristics and technical limitations associated with the chemical intended to by studied.

Overall, a prioritized scheme should be used to determine whether to go forward with bioavailability studies. A higher priority should be given to well-studied metals such as arsenic where the regulatory agency has a history of accepting *in vitro* studies to establish alternative clean-up levels. On the other end of the spectrum are cases which receive a lower priority such as an organic contaminant with sparse bioavailability data in the literature, at a site where only *in vivo* studies are likely to be accepted, where time and financial resources are minimal, and where the likelihood of successfully reducing the clean-up criteria is low. Each chemical/site combination should be evaluated on a case by case basis to determine the best path forward.

SECTION 3

SURVEY OF STATE REGULATORS

3.1 INTRODUCTION

In order to support the goal of this project to investigate the feasibility of developing and using bioavailability adjustment factors to modify intake assumptions on a site-specific basis, a survey was conducted for the Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis (AFIERA) to determine the policies of each state regarding use of site-specific bioavailability data in conducting human health risk assessments. Each of the fifty states was contacted via electronic mail and/or telephone to request information on guidance documents used to determine the applicability of bioavailability considerations in risk assessment, the previous use of site-specific bioavailability adjustments, and the likelihood of the state accepting bioavailability considerations in future risk assessments.

Section 3.2 of this report provides information on the methods used to conduct the survey. Section 3.3 presents the findings and a discussion of the survey questionnaire results. Section 3.4 provides a concluding discussion with recommendations for future activities.

3.2 SURVEY METHODS

The first step in this task involved the preparation of the "State Human Health Risk Assessment Survey: Acceptance of Bioavailability Data" questionnaire. The questions were selected to provide both general information and specific details on selected program elements. The general information included information on the point-of-contact (e.g., titles, phone number, e-mail address, agency and division, department, or branch primarily responsible) along with the titles of documents related to bioavailability guidance or regulations. Some of the specific components included in the survey were: 1) written guidance on the use of bioavailability in human health risk assessments; 2) information regarding the state's plans for producing guidance; 3) default guidelines the states use if no state-specific guidance exists; 4) methodologies for incorporating bioavailability considerations for organic compounds versus inorganic compounds; and 5) information regarding the state's acceptance of human health risk assessments that successfully incorporated bioavailability data. A copy of the questionnaire is provided as Attachment B of this report.

The point(s)-of-contact for each state were initially identified through the use of a database assembled for a previous survey performed for AFIERA by Parsons ES. To construct this database the point(s)-of-contact were identified through each states' environmental agency web site. Each of the perspective contacts was phoned to obtain

some basic information on the current and anticipated risk-based programs and to verify the point-of-contact. A phone-log was kept throughout the project. From these phone conversations the appropriate contact was identified and arrangements were made either via email or FAX to complete the survey and return the response.

Some of the points-of-contact had changed since the database was initially created. In cases where the initial attempt to contact the state contact failed, the above process was repeated until a valid point-of-contact was determined. The database was updated based on the information received in response to the survey. States that did not respond were contacted by phone several times during the course of this project. A phone log was kept throughout the project.

3.3 PRESENTATION AND DISCUSSION OF RESULTS

The goal of this survey was to identify the prevalence of site-specific bioavailability adjustments in human health risk assessment. A secondary goal of this survey was to determine the potential acceptability of the use of bioavailability adjustments in risk assessment. This was done through contact with those agencies that establish guidance for performing risk assessments and review risk assessments for sites requiring regulatory oversight.

Representatives from each of the fifty states and ten USEPA regions were sent survey questionnaires via e-mail. Of those, 31 states returned their completed questionnaires as of May 25, 2000. However, three states generally viewed as progressive in the field of risk assessment, California, Massachusetts, and Texas, have not responded to the survey despite repeated requests. In general, the state environmental agencies that returned questionnaires do not have guidelines currently in place for the use of bioavailability adjustments in human health risk assessment and rely nearly exclusively on USEPA risk assessment protocols. These USEPA guidance documents (such as the Risk Assessment Guidance for Superfund) generally do not provide guidance on developing site specific bioavailability factors. Rather, the guidance outlines the use of bioavailability factors (whether site-specific or literature based) in adjusting intake rates.

It should be noted that contact with most states was limited to a single individual. Therefore, responses are limited to the specific knowledge of that individual. It is recognized that this introduces a level of uncertainty to the analysis of results. It should also be recognized that this survey represents a "snapshot in time" of the status of the various states acceptance of bioavailability factors. The following section presents a summary of the findings of the survey. The survey responses for each state are presented in tabular form in Attachment C.

3.4 FINDINGS

The findings are summarized and presented with regard to each question of the survey.

Does your state or agency have any written guidance on the use of bioavailability (whether for or against) in conducting human health risk assessments? If so, could you provide us copies of this guidance and the reference information below?

Of the 31 states that responded to the survey, only representatives of West Virginia and Minnesota provided guidance documents that specifically address the use of site-specific bioavailability data. The documents address both the use of *in vivo* and *in vitro* studies to determine site-specific bioavailability.

The contact in Ohio provided a reference to a guidance document which addressed the use of gastrointestinal absorption for developing an industrial lead standard. However, this document does not consider site-specific bioavailability adjustments.

The point of contact in Illinois indicated that an internal guidance document was produced that allows the use of site-specific bioavailability factors for lead and arsenic. This memo states that until more appropriate technical approaches are developed and peer-reviewed at a national level, only bioavailability determinations using animal models would be allowed. This guidance document was not provided since it is for internal use only. The Illinois contact also indicated that in order for bioavailability adjustments to be made in risk assessments, the absorption of the chemical in the media used in the critical study (e.g., food, water) for determining the toxicity factors must be known.

The New Jersey contact stated that there is an option to develop site-specific alternate cleanup criteria when developing soil cleanup criteria. Bioavailability is expected to be an option in the development of these criteria, but the methodology is not yet developed.

Michigan's point of contact indicated that some of its technical support documents for risk assessment address the use of bioavailability. The contact stated that some of these documents do allow for the use of chemical-specific absorption, efficiency values, or soil-related characteristics.

The point of contact in Louisiana stated that they did not have specific guidance on the use of bioavailability adjustments, but the data would be allowed in site-specific assessments.

Contacts in a number of states indicated that they followed USEPA guidance on bioavailability, and most of those states referenced USEPA's Risk Assessment Guidance for Superfund (various citations).

Are you aware if your state or agency has any plans of producing guidance on the use of bioavailability (for or against) in the near future? If so, is there a tentative date for when this guidance will be available?

New Jersey was the only state that indicated plans to produce guidance regarding bioavailability. New Jersey's contact indicated that the state is part of a research oversight group called the Solubility/Bioavailability Research Coalition (SBRC). The key objective of this group is to develop, validate, and standardize an *in vitro* test for estimating the bioavailability of inorganic elements from soil, resulting in accurate estimates of human health risk, and more realistic site-specific cleanup criteria. None of the other states responding to the survey indicated plans to produce a guidance document on the use of bioavailability in risk assessment. However, the contact in Delaware did indicate that there was no reason why the concept shouldn't be considered.

If the state has no documents regarding the use of bioavailability data in conducting human health risk assessments, does the state default to other guidelines? If so, could you provide us the reference information below?

Representatives from fifteen of the responding states indicated they follow USEPA guidance (both national and regional) with regard to risk assessment. The Risk Assessment Guidance for Superfund documents were the most often referenced. Contacts from the remaining states either did not respond to the question, indicated that they were unaware of any guidance documents, or indicated that the question was not applicable.

Are the methodologies, if any, different for organics versus inorganics? If so, how?

The contact in Illinois indicated that the state is only considering bioavailability of lead and arsenic at this time, while the New Jersey representative indicated that the SBRC is only looking at inorganic compounds.

Louisiana's contact stated that they expect methodologies for organic compounds and inorganic compounds would be different based on their different chemical/physical properties.

Are you aware if your state or agency has ever accepted a human health risk assessment that successfully incorporated bioavailability data? If so, could you please provide us a copy of this document?

Representatives from four states (Arizona, Colorado, Illinois, and Michigan) indicated that risk assessments that incorporated site-specific bioavailability factors were accepted by their agencies. These risk assessments were all for lead or arsenic. Illinois changed its policy since the risk assessments were accepted because they used *in vitro* data, and animal studies are now required in Illinois. Upon further review, the contact in Arizona indicated that they used bioavailability data from a site in another state.

The contact in one state, Kentucky, indicated that risk assessments had been submitted that attempted to use bioavailability adjustments. However, the state did not accept them because none generated sufficient information to support the evaluation.

Kentucky's concern is the evaluation of future risks, and they believe there is no way to predict changes in the future that may affect bioavailability.

EPA Region II also indicated that risk assessments had been submitted that attempted to use bioavailability arguments. However, these risk assessments used bioavailability adjustment factors that were based on values found in the literature, not based on a site-specific study. These adjustments were not approved by USEPA Region II.

3.5 CASE STUDIES

Overall, there are very few "success stories" associated with the use of bioavailability adjustment factors. In most cases, the state and EPA regulators that responded to the survey were unaware of any risk assessments that successfully incorporated bioavailability adjustments. In some cases, states that were reported to have accepted risk assessments using bioavailability adjustments[17] , such as California, Texas, and Oklahoma, reported that they were unaware of any.

Michigan regulators submitted a risk assessment that successfully incorporated a bioavailability adjustment factor of 10% for arsenic in soil. This adjustment was based on the findings of an *in vitro* bioavailability assay that measured dissolution from soil. The use of this information resulted in approximately a 10-fold decrease in the risk estimate associated with exposure to arsenic.

USEPA Regions VIII and X, while indicating that they have accepted risk assessments using bioavailability adjustments, did not supply copies of these risk assessments to evaluate the methodology. Although, it is known that these regions only accept *in vivo* results for use in risk assessments.

3.6 DISCUSSION AND RECOMMENDATIONS

Results of this survey indicate there is very little guidance available on the use of site-specific bioavailability information in human health risk assessment. While there is little guidance, it appears that state regulators are willing to consider the use of bioavailability adjustments on a site-specific basis. However, it also appears that most states will follow the lead of the USEPA. Therefore, it is critical to get USEPA approval on any methodology developed for deriving site-specific bioavailability. Current USEPA policy is to require the use of *in vivo* studies for developing bioavailability adjustments for risk assessment. However, *in vitro* studies can and have been used for range finding, to refine the *in vivo* studies, and thus reduce the cost associated with developing bioavailability adjustment factors.

There are a number of sites that have successfully used site-specific bioavailability adjustments in human health risk assessments. However, these sites were predominantly lead and arsenic contaminated sites. These sites were then allowed to

leave higher levels of contaminants in place because the contaminants were less bioavailable then assumed in deriving toxicity factors.

In conclusion, the use of bioavailability adjustments may be justified at some sites. At this point, these sites are generally large sites with lead or arsenic contamination. An comparison of the increased study cost to develop bioavailability adjustment factors should be compared to the decrease in remediation costs to determine if the development of bioavailability factors is justified at the site. Future investigations into the bioavailability of other contaminants will facilitate a wider use of bioavailability adjustments.

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15. Ruby, M.V., A. Davis, J.H. Kempton, J.W. Drexler, and P.D. Bergstrom. 1992. Lead Bioavailability: Dissolution kinetics under simulated gastric conditions. Environ. Sci. Technol. 26:6

16. Ruby, M.V., A. Davis, T.E. Link, R. Schoof, R.L. Chaney, G.B. Freeman, and P. Bergstrom. 1993. Development of an in vitro screening test to evaluate the *in vivo* bioaccessibility of ingested mine-waste lead. Environ. Sci. Technol. 27:13

17. Personal communication with Dr. Michael Ruby, May, 2000.

Attachment A
List Of Databases Searched

LIST OF DATABASES SEARCHED

1: INSPEC_1969-2000/Apr W1
2: Biosis Previews(R)_1969-2000/May W2
3: NTIS_1964-2000/May W4
4: Ei Compendex(R)_1970-2000/Apr W3
5: Business & Industry(R)_Jul/1994-2000/May 11
6: AGRICOLA_70-2000/Apr
7: Mechanical Engineering Abs_1973-2000/May
8: ABI/INFORM(R)_1971-2000/May 11
9: Gale Group PROMT(R)_1990-2000/May 11
10: Gale Group F&S Index(R)_1988-2000/May 11
11: World Reporter_1997-2000/May 11
12: Oceanic Abst._1964-2000/May
13: Meteor.& Geoastro.Abs._1970-2000/Apr
14: World Surface Coatings Abs_1976-2000/Mar
15: METADEX(R)_1966-2000/Jul B1
16: Aluminum Ind Abs_1968-2000/May
17: SciSearch(R) Cited Ref Sci_1990-2000/May W1
18: DISSERTATION ABSTRACTS ONLINE_1861-1999/DEC
19: Enviroline(R)_1975-2000/Feb
20: Pollution Abs_1970-2000/May
21: PHARMACEUTICAL NEWS INDEX_1974-1999/Dec W1
22: Health News Daily_1990-2000/May 12
23: Aquatic Sci&Fish Abs_1978-2000/May
24: Gale Group Magazine DB(TM)_1959-2000/May 11
25: PAIS Int._1976-2000/Mar
26: CAB Abstracts_1972-2000/May
27: Food Sci.&Tech.Abs_1969-2000/Jun
28: TSCA Chemical Substances Inventory_2000/Feb
29: FOODLINE(R): Food Science & Technology_1972-2000/May 11
30: FOODLINE(R): Market Data_1972-2000/APR 20
31: GeoArchive_1974-2000/Apr
32: FOODLINE(R): Current Food Legislation_1972-2000/Mar 30
33: SPIN(R)_1975-2000/Mar W4
34: Transport Res(TRIS)_1970-2000/Apr
35: Inside Conferences_1993-2000/May W1
36: World Textiles_1970-2000/Apr
37: Env.Bib._1974-2000/Feb
38: SEDBASE_1996/Jan Q1
39: ELSEVIER BIOBASE_1994-2000/Apr W4
40: EMBASE_1974-2000/Apr W3
41: Int.Pharm.Abs._1970-2000/Apr
42: Life Sciences Collection_1982-2000/Mar
43: Conference Papers Index_1973-2000/Mar
44: Foods Adlibra(TM)_1974-2000/Apr
45: TGG Aerospace/Def.Mkts(R)_1986-2000/May 11
46: TULSA (Petroleum Abs)_1965-2000/May W1
47: GeoRef_1785-2000/May B1

48: MANTIS(TM)_1880-2000/Mar
49: IHS Intl.Stds.& Specs._1999/Nov
50: TableBase(R) Sep_1997-2000/Apr W5
51: JICST-EPlus_1985-2000/Jan W3
52: FLUIDEX_1973-2000/Apr
53: General Sci Abs/Full-Text_1984-1999/Oct
54: Wilson Appl. Sci & Tech Abs_1983-2000/Apr
55: Energy SciTec_1974-2000/Feb B2
56: AESIS_1851-2000/Feb
57: Adis R&D Insight_1986-2000/Apr W5
58: Aerospace Database_1962-2000/Apr
59: Nuclear Sci. Abs._1948-1976
60: WasteInfo_1974-2000/Apr
61: TGG Natl.Newspaper Index(SM)_1979-2000/May 11
62: MF Industry & Prod News_1998-2000/May 11
63: European R&D Database_1997
64: Research Centers & Services_1994-2000/Jan
65: Brands & Their Companies_2000/Jan
66: Water Resour.Abs._1967-2000/Apr
67: ICONDA-Intl Construction_1976-2000/May
68: Textile Technol.Dig._1978-2000/May
69: CLAIMS(R)/Current Legal Status_1980-2000/Apr 25
70: CLAIMS(R)/REFERENCE_2000/Q4
71: TRADEMARKSCAN(R)-U.K._2000/Apr B2
72: TRADEMARKSCAN(R)-Canada_2000/May 03
73: PHARMAPROJECTS_1980-2000/Apr W5
74: PHIND(Archival)_1980-2000/May W1
75: PHIND(Daily & Current)_2000/May 11
76: Pharmacontacts_2000/Mar
77: Biol. & Agric. Index_1983-2000/Apr
78: Pascal_1973-2000/May W1
79: Gale Group Trade & Industry DB_1976-2000/May 11
80: TGG Health&Wellness DB(SM)_1976-2000/Apr W5
81: Gale Group Legal Res Index(TM)_1980-2000/May 10
82: HealthSTAR_1975-2000/May
83: MEDLINE(R)_1966-2000/Jun W5
84: Toxline(R)_1965-2000/Apr
85: DIOGENES(R)_1976-2000/May W1
86: Gale Group PROMT(R)_1972-1989
87: Occ.Saf.& Hth._1973-1998/Q3
88: CAB HEALTH_1983-2000/Mar
89: Allied & Complementary Medicine(AMED)_1984-2000/Apr
90: EVENTLINE(TM)_1990-1999/NOV
91: Medical Device Register (R)_1999
92: Healthcare Organizations_1999
93: EMBASE Alert_2000/Apr W3
94: Pharm-line(R)_1978-2000/Apr W1
95: Adv.& Agency Red Books:Advertisers_2000/Apr
96: Adv.& Agency Red Books:Agencies_2000/May

97: Federal Register_1985-2000/May 11
98: Zoological Record Online(R)_1978-1999/V135P39
99: F-D-C Reports_1987-2000/Apr W5
100: Health Devices Sourcebook_(1999)
101: NDA Pipeline: New Drugs_1991-1999/Dec
102: Industry Trends & Anal._1997/Jun
103: FINDEX_1982-1999/Q2
104: Health Devices Alerts(R)_1977-2000/May W2
105: Information Science Abs._1966-2000/Jan
106: AGRIS_1974-2000/Mar
107: Gale Group Newsearch(TM)_2000/May 11
108: CLAIMS(R)/Citation(1790-1946)__1999/Q4
109: CLAIMS(R)/Citation(1947-1970)__1999/Q4
110: CLAIMS(R)/Citation(1971-1997)__1999/Q3
111: TRADEMARKSCAN(R)-US FED_OG000502/AP000120
112: TRADEMARKSCAN(R)- Community Tmks_2000/Apr B2
113: TRADEMARKSCAN(R)-Spain_2000/Apr B2
114: Drug Info._1998/98Q3
115: Internet & Personal Comp. Abs._1981-2000/May
116: Abs. in New Tech & Eng._1981-2000/Apr
117: Mathsci_1940-2000/Jun
118: PAPERCHEM_1967-2000/Apr
119: Elec. Power DB_1972-1999Jan
120: CLAIMS(R)/REFERENCE_2000/Q4
121: WATERNET(TM)_1971-1999Q4
122: TRADEMARKSCAN(R)-U.S. STATE_2000/May 03
123: PIRA_1975-2000Jun W2
124: Packaging Sci&Tech_1982-1997/Oct
125: SoftBase:Reviews,Companies&Prods._85-2000/Apr
126: API EnCompass(TM):News_1975-2000/May 09
127: DIALOG Defense Newsletters_1989-2000/May 10
128: FEDRIP_2000/Apr
129: Materials Bus.(TM)_1985-2000/May
130: Gale Group Computer DB(TM)_1983-2000/May 11
131: Microcomputer Software Guide_2000/Apr
132: BioBusiness(R)_1985-1998/Aug W1
133: Biocommerce Abs.& Dir._1981-2000/May B1
134: GEOBASE(TM)_1980-2000/May
135: Eng Materials Abs(R)_1986-2000/May
136: Chapman & Hall Chemical Database_1997/Apr
137: The Merck Index Online(SM)_/1999S1
138: Analytical Abstracts_1980-2000/Apr W5
139: Pesticide Fact File_1998/Jun
140: DOSE_1999/S2
141: ChemEng & Biotec Abs_1970-2000/Mar
142: Chemical Safety NewsBase_1981-2000/May
143: Chem-Intell Chem Manu Plnts_1999/Jul
144: Chem Bus NewsBase_1984-2000/May 11
145: PLASPEC Materials Select DB_1999/Feb

146: Polymer Online_
147: RAPRA Rubber & Plastics_1972-2000/Apr B2
148: Thomson Risk Management Dir._10/98
149: Material Safety Data Sheets - OHS_1999/Q4
150: Material Safety Summary Sheets_2000/Q4
151: Material Safety Label Data_1999/Q4
152: Ceramic Abstracts_1976-2000/Q2
153: RTECS_2000/Q1
154: CHEMTOX (R) Online_1998/Q3
155: CLAIMS(R)/US Patent_1950-00/May 02
156: Derwent Patents Citation Indx_1978-98/200004
157: Chinese Patents ABS_Apr 1985-2000/Feb
158: Inpadoc/Fam.& Legal Stat_1968-2000/UD=200017
159: JAPIO_Oct 1976-1999/Oct(UPDATED 000208)
160: European Patents_1978-2000/Apr W03
161: PCT Fulltext_1983-2000/UB=, UT=20000413
162: DERWENT WPI_1963-2000/UD=, UM=, & UP=200022
163: APIPAT_1964-2000/Apr W2
164: APILIT(R)_1965-2000/Apr W2
165: Derwent Biotechnology Abs_1982-2000/May B1
166: Current BioTech Abs_1983-1999/Dec
167: Chemical Economics Handbook_2000/Mar
168: Specialty Chemicals Update Program_2000/Q1
169: Dir. of Chem. Producers-Products_2000/Q1
170: Dir. of Chem. Producers-Companies_2000/Q1
171: New Scientist_1994-2000/Apr W5
172: Science_1996-1999/Jul W3
173: French Patents_1961-2000/BOPI 0016
174: Derwent Drug Registry_1997-2000/May W1
175: PEDS: Defense Program Summaries_1999/May
176: Beilstein Online_
177: Adis Newsletters(Current)_2000/May 12
178: Adis Newsletters(Archive)_1982-2000/Mar 27
179: MediConf: Medical Conf. & Events_1998-1999/Jun
180: SciSearch(R) Cited Ref Sci_1974-1989/Dec
181: Current Contents Search(R)_1990-2000/May W3
182: ESPICOM Pharm&Med DEVICE NEWS_2000/Jan W5
183: AMA Journals_1982-2000/Apr W2
184: IMSWorld Pharm. Co. Dir._1982-2000/Q2
185: New England Journal of Med._1985-2000/Apr W2
186: IMSWorld R&D Focus_1991-2000/Apr W5
187: IMSWorld Patents International_2000/Apr
188: IMSWorld Company Profiles_1992-2000/Apr
189: Publ., Distr.& Wholesalers_2000/Apr
190: Drug News & Perspectives_1992-2000/Apr
191: NME Express_1992-2000/Dec B1
192: The Lancet_1986-2000/May W1
193: USP DI(R) Vol. I_1998/Q3
194: USP DICTIONARY (USAN)_1997

195: ExtraMED(tm)_1998/Jun
196: Public Opinion_1940-2000/May W1
197: Gale Group Company Intelligence(R)_2000/May 11
198: DELPHES EUR BUS_80-1999/DEC W3
199: Periodical Abstracts Plustext_1986-2000/May W1
200: ACNielsen Market Statistics/Canada_1995-1997/Sep
201: Fuji-Keizai Market Research_1996-1997/Jul
202: ESPICOM Pharm & Med Co. Profile_2000/Apr
203: ESPICOM Telecom./Power Rpts_2000/May
204: DIALOG Investment Res. Index_1995-2000/May 10
205: D&B-Dun`s Elec. Bus. Dir.(TM)_2000/01
206: D & B - Duns Market Identifiers_2000/Apr
207: D&B-Int.Dun`s Market Identifiers(R)_2000/Apr
208: D&B-Canadian Dun`s Mkt. Ident.(R)_2000/03
209: S&P`s Register-Corp._2000/May
210: Amer. Bus. Directory_2000/Mar
211: Canadian Bus. Directory_2000/Q1
212: Thomas Register Online(R)_1999/Q4
213: Investext(R)_1982-2000/May 11
214: Experian Business Credit Profiles_2000/May W1
231: KOMPASS Latin America_2000/Jan
232: Jane`s Defense&Aerospace_2000/May W1
233: FI Defense Market Intelligence_2000/May 10
234: KOMPASS Western Europe_2000/Feb
235: Kompass UK_1998/Jul
236: Kompass Asia/Pacific_1999/Nov
237: KOMPASS Central/Eastern Europe_2000/May
238: U.S. Newswire_1999-2000/May 11
239: KR/T Bus.News._1992-2000/May 11
240: Business Wire_1999-2000/May 11
241: PR Newswire_1999-2000/May 11
242: Gale Group New Prod.Annou.(R)_1985-2000/May 11
243: McGraw-Hill Publications_1985-2000/May 11
244: Business Dateline(R)_1985-2000/May 11
245: Gale Group Newsletter DB(TM)_1987-2000/May 11
246: Journal of Commerce_1986-2000/May 11
247: Consumer Reports_1982-2000/Apr
248: CMP Computer Fulltext_1988-2000/Apr W5
249: Gale Group Newswire ASAP(TM)_2000/May 11
250: US Patents Fulltext_1971-1979
251: US Patents Fulltext_1980-1989
252: US Pat.Full._1990-2000/May 09
253: TRADEMARKSCAN(R)-France_2000/Apr B2
254: TRADEMARKSCAN(R)-Benelux_2000/Apr B2
255: TRADEMARKSCAN(R)-Denmark_2000/Apr B2
256: Federal News Service_1991-2000/May 09
257: TRADEMARKSCAN(R)-Switzerland_2000/Apr B2
258: TRADEMARKSCAN(R)-Austria_2000/Apr B2
259: TRADEMARKSCAN(R)-Monaco_2000/Apr B2

260: U.S. Newswire_1995-1999/Apr 29
261: LitAlert_1973-2000/UD=200014
262: TRADEMARKSCAN(R)-Intl Register_2000/Apr B2
263: TRADEMARKSCAN(R)-Germany_2000/Apr B2
264: TRADEMARKSCAN(R)-Italy_2000/Apr B2
265: Computer News Fulltext_1989-2000/Mar W2
266: TRADEMARKSCAN(R)-Liechtenstein_2000/Apr B2
267: DIALOG Telecom. Newsletters_1995-2000/May 11
268: Emerging Mkts & Middle East News_1995-2000/May 11
269: Asia/Pac Directory_1999/Sep
270: Datamonitor Market Res._1992-1998/Jun
271: Euromonitor Market Res._1991-2000/Apr
272: Freedonia Market Res._1990-2000/Apr
273: BCC Market Research_1989-2000/May
274: Frost & Sullivan_1992-1999/Apr
275: (R)Kalorama Info Market Res._1993-2000/Apr
276: Frost & Sullivan Market Eng_2000/Apr
277: EIU Market Research_2000/May 05
278: Beverage Marketing Research_2000/Jan
279: Tax Notes Today_1986-2000/May 11
280: State Tax Today_1991-2000/May 11
281: Business Wire_1986-1999/Feb 28
282: PR Newswire_1987-1999/Apr 30

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Attachment B
Survey Form

STATE HUMAN HEALTH RISK ASSESSMENT SURVEY

ACCEPTANCE OF BIOAVAILABILITY DATA

Sir/Madam:

We are conducting a survey for the Air Force Institute for Environment, Safety and Occupational Health Risk Analysis (AFIERA) to determine the acceptability in your state for use of bioavailability data in conducting human health risk assessments. We would be grateful if you could provide input to the following:

CONTACT INFORMATION

Information on Points of Contact Name(s):

Phone Number:

Fax Number:

E-Mail Address:

Name of state or commonwealth:

Name of state environmental agency:

Division, department, or branch primarily responsible for human health risk assessment aspects of the program:

SURVEY

1. Does your state or agency have any written guidance on the use of bioavailability (whether for or against) in conducting human health risk assessments? If so, could you provide us copies of this guidance and the reference information below?

   Name of reference:

   Citation or Document Number:

   Date of most recent version:

   Date of next scheduled revision:

2. Are you aware if your state or agency has any plans of producing guidance on the use of bioavailability (for or against) in the near future? If so, is there a tentative date for when this guidance will be available?

3. If the state has no documents regarding the use of bioavailability data in conducting human health risk assessments, does the state default to other guidelines? If so, could you provide us the reference information below?

   U.S. EPA Region __ Federal U.S. EPA __ Other __ Not Applicable __

   Name of reference:

   Citation or Document Number:

   Date of most recent version:

   Date of next scheduled revision:

4. Are the methodologies, if any, different for organics versus inorganics? If so, how?

5. Are you aware if your state or agency has ever accepted a human health risk assessment that successfully incorporated bioavailability data? If so, could you please provide us a copy of this document?

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Attachment C
Survey Responses

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
Alabama	Chip Crokett (334) 271-7747 fax (334) 279-3050 vhc@adem.state.al.us Alabama Dept. of Env. Management(ADPH) Land Division (ADEM) & Alabama Dept. of Public Health (ADPH)	No state-specific guidance. Generally reference national guidance or receive site specific consultation from ADPH.	No plans for the development of guidance.	U.S. EPA Region: _4_ Federal U.S. EPA:____ Other: _____ Not Applicable: _____ Risk Assessment Guidance for Superfund (RAGS)		I'm unsure as to what specific bioavailability data this question refers to. Any human-health risk assessment calculation must include some type of bioavailability parameter. Most risk assessments reviewed by this Dept. incorporate standard parameters obtained from literature.
Alaska	Stephanie Pingree (907) 465-5152 (907) 465-5262 spingree@envircon.state.ak.us Dept. of Environmental Conservation Division, department or branch primarily responsible for human health risk assessment aspects of the program: Department of Env.	*No, bioavailabillty guidance is only available for ecological risk assessments.*	No plans at this time.	We have no default methodology listed in regulation or guidance. We accept EPA methodology if presented. U.S. EPA Region: __X__ Federal U.S. EPA: __X__ Other: _____ Not Applicable: _____	See answer to Question #3	We know of one human health risk assessment that it was discussed in uncertainty analysis only.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	Conservation, Divisions of Spill Prevention & Response, Contaminated Sites Remediation Program Hazardous Waste Division					
Arizona	No single point of contact, individual programs will handle as necessary Arizona Dept. of Environmental Quality The individual programs (i.e. Hazardous Waste, WQARF which is AZ's state superfund, Voluntary, etc.) are responsible for reviewing the technical aspects. The Arizona Dept. of Health Services provides some support in the RA review or the program may	None, we rely on EPA guidance for Risk Assessments	Not aware of any plans at this time. In the past, the Dept. was developing guidance but staff have been reassigned without completing the task.	U.S. EPA Region ____ Federal U.S. EPA __X__ Other _____ Not Applicable _____	Don't know.	Yes, I am aware of one – the Voluntary program approved a cleanup based on a risk assessment that incorporated bioavailability. I think it was for BHP Superior mine site. I do not have a copy but you could contact Al Roesler at (602) 207-4166 for more information.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	contract with an outside firm to do.					
Arkansas	Tammie Hynum/Dennis Rostad (501)682-0856/(501)682-0869 fax (501)682-0565 rostad@adeq.state.ar.us Arkansas Dept. of Environmental Quality Hazardous Waste Division	No	There are no plans at this time to produce such guidance.	Yes, ADEQ defers to EPA related guidance and/or EPA supported/recommended guidance on this matter, as is also the case for nearly all other aspects of both the human health and ecological risk assessment procedures, protocols and activities. U.S. EPA Region __6__ Federal U.S. EPA __X__ Other _____ Not Applicable _____ ADEQ is not aware of any specific guidance document from EPA on bioavailability as it relates, in particular, to human health risk assessments. It is our understanding,	N/A	No examples of the circumstances described above come to mind.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
				however, that the concept of bioavailability has, to the extent practicable, been incorporated into EPA's overall Risk Assessment Guidance for Superfund, which, as you know, is made up of numerous guidance documents addressing the various aspects/components of the risk assessment process.		
California	Jim Polisini 818-551-2853 fax 818-551-2849 jp_one@ix.netcom.com California Environmental Protection Agency Department of Toxic Substances Control [Hazardous waste sites, permitted facilities]	DTSC has no written guidance for the use/prohibition of bioavailability data in HHRA.	I am not aware of any guidance on the use of bioavailability in HHRAs in preparation or planned.	No, DTSC does not default to other guidelines on bioavailability.	Not applicable.	I am not aware of bioavailibility being utilized in a HHRA submitted to DTSC. Bioavailability has been used for lead in the Ecological Risk Assessment at the Presidio of San Francisco and Parcel E at Hunters Point Shipyard.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	Office of Environmental Health Hazard Assessment [California slope factors, Proposition 65, many more] Air Resources Board [Health impacts from air contaminants] State Water Resources Control Board [Water impacts, minor human health risk assessment involvement] Department of Pesticide Regulation [Pesticide use permits, impacts of pesticides on human health]					

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
Colorado	Jane Mitchell (303) 692-2644 fax (303) 782-0904 jane.mitchell@state.co.us Colorado Dept. of Public Health and Env. (CDPHE) Disease Control and Env. Epidermiology Division, Env. Toxicology Section	N/A	No current plans.	U.S. EPA Region _____ Federal U.S. EPA __X__ Other _____ Not Applicable _____		Site specific studies of the bioavailability of lead contaminated soils in swine were conducted by EPA for the California Gulch Superfund Site, OU9 Residential Soils in Leadville, CO. The study results were quite close to the current default value used in the IEUBK model. Copies of this risk assessment report are available from EPA Region 8 ("Baseline Human Health Risk Assessment California Gulch Superfund Site, Leadville, Colorado, Part A – Risks to Residents from Lead." Prepared by Roy F. Weston. January 1996.)
Connecticut	Mark Lewis 860.424.3768 mark.lewis@po.state.ct.us	Bill (didn't catch last name) is now at this number, called and left message 9:10 am 03/30/00 - Spoke with Mark Lewis, got his correct email address, emailed survey to him 04/14/00, he will try and get it back by Tuesday - called 6/26/00 he will be out of the office until July 3rd, left message				

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
Delaware	Kurt Olinger/ Robert Allen/ Larry Jones (302) 395-2600 fax (302) 395-2601 rallen@state.de.us Dept. of Natural Resources & Env. Control Site Investigation & Restoration Branch	N/A	Not aware of any plans. However, there is no good reason why the concept shouldn't be considered.	U.S. EPA Region ____ Federal U.S. EPA ____ Other _____ Not Applicable __X__	N/A	Not aware of any. Our Remediation Standards are based on EPA Region III Risk-Based Concentration Tables, which assume complete ingestion of a contaminant by a human receptor.
Florida	Ligia Mora-Applegate (805)488-0793 fax (805) 921-1815 Ligia.Mora-Applegate@dep.state.fl.us Dept. of Environmental Protection Bureau of Waste Cleanup	No	No	No U.S. EPA Region ____ Federal U.S. EPA ____ Other _____ Not Applicable _____	No	None
Georgia	Cliff Qpdyke (404) 657-8644 cliff_opdyke@mail.dnr.state.ga.us	No.	No.	No.	No.	No.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	Hazardous Waste Management Branch Georgia Env. Protection Division					
Hawaii	Barbara Brooks (808) 586-4249 fax (808) 586-7537 bbrooks@eha.health.state.hi.us Department of Health Hazardous Evaluation and Emergency Response	No	No plans in the near future.	U.S. EPA Region __x__ Federal U.S. EPA ____ Other _____ Not Applicable _____	See EPA guidance.	Not aware if risk assessments have been accepted using site-specific bioavailability data. Hawaii currently uses EPA guidance.
Idaho	Bill Allred 208.736.2190 ballred@deq.state.id.us	Called at 10:09 am 03/30/00, spoke with secretary, Bill will be out of the office until Friday, got his email address and emailed survey to him - spoke with secretary on 5/4/00, left messege - 6/26/00 followed up with reminder email left message				
Illinois	Connie Sullinger (217) 785-0830 fax (217) 782-1431 epa8565@spa.state.il.us Illinois EPA Office of Chemical Safety	The Office of Chemical Safety has prepared a guidance memo regarding the bioavailability of lead and arsenic via soil ingestion, which is for internal use only within the Agency. Essentially, this memo states that until more	Not in the near future.	U.S. EPA Region ____ Federal U.S. EPA ____ Other _____ Not Applicable __X__	Only for lead and arsenic, as discussed above.	The Agency has accepted one such document, which used a site-specific determination of metal bioavailability from slag at a former steelmaking site. This risk assessment used in vitro

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
		appropriate technical approaches are developed and peer-reviewed at the national level, only site-specific bioavailability determinations using animal models will be acceptable for using bioavailability in risk assessments. The Office of Chemical Safety also has two unwritten policies regarding the use of bioavailability in risk assessments. First, measurements of bioavailability must be available in both human and animal exposures in order to justify oral-to-dermal extrapolations. Second, this Office routinely requires that the bioavailability of a chemical be evaluated in the critical study used to develop a toxicity criterion (Reference Dose,				measures of oral and dermal bioavailability to adjust upward the soil remediation objectives for lead (it must be stated that this demonstration occurred before the current policy of requiring animal studies was instituted, and would not be acceptable now). Since the risk assessment is a bulky, multi-volume document, if it is desired to obtain a copy it is recommended that the Agency's Bureau of Land be contacted to arrange delivery of the risk assessment for the USX site (217- 782-6761).

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
		Reference Concentration, etc.) whenever it is proposed to adjust for bioavailability in a risk assessment. This is required to determine if the bioavailability found in the critical study is significantly different from the proposed bioavailability and if bioavailability was specifically included in the development of the criterion, to determine if the proposed value is justifiable.				
Indiana	Bob Moran (317) 232-4419 bmoran@dem.state.in.us	Emailed survey 03/29/00 - left messege 04/14/00 - spoke with Bob 5/4/00, said he thought he sent it to us but wasn't sure, emailed to him again; 6/26/00 followed up with reminder email				
Iowa	Susan Dixon (515) 242-6346 susan_dixon@dnr.state.ia.us	Emailed survey 03/29/00 - called at 10:17 am 03/30/00 he referred me to Susan Dixon (515) 242-6346, she will be out of the office until Monday, got her email address susan_dixon@dnr.state.ia.us and left message, emailed survey to her - 6/26/00 followed up with reminder email				

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
Kansas	Frankie Arnwin 785.296.1665 farnwine@kdhe.state.ks.us	Emailed survey 03/29/00 - left messege 04/14/00 - called 5/4/00 left messege with secretary - 6/26/00 followed up with reminder email				
Kentucky	Dr. Albert Westerman/Larry Taylor Division of Environmental Protection 100 Sower Blvd., Suite 104 Frankfort, Kentucky 40601 (502) 564-6120 fax (502) 564-8930 Albert.Westerman@mail.state.ky.us / Larry.Taylor@mail.state.ky.us	No, site specific evaluation. However, we have a general approach with regard to dermal absorption of chemicals, a sort of bioavailability consideration. Subsequent to the adjustment of an Oral RFD or slope factor by published G.I. absorption rates or by generalized absorption factors recommended by U.S. Region 4 EPA (i.e., 80% VOCs, 50% SVOCs, 20 % inorganics), we recommend that assessors use a dermal absorption factor of 25% for VOCs, 10% for SVOCs and 5% for inorganics, a sort of bioavailability	No.	No.	They would be certainly be, actually more of a site specific-chemical specific evaluation.	We have had several facilities that have tried to incorporate bioavailability in their human and ecological health risk assessments. To date, none have generated sufficient information to support our acceptance of their evaluation. The primary problem relies on the applicability of their availability determination to future risks. For example, you can add limestone to an effluent, sediment, soil ect. and reduce the bioavailability of the metals. However, that is a short-term fix, over time the pH often goes back down

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
		determination.				from rain events and you are back to a drinking water source with highly bioavailable metals; future risks underestimated.
Louisiana	Tom Harris/ John Halk (225) 765-0355/ (225) 765-0487 fax (225) 765-0617/ (225) 765-0435 tharris@deq.state.la.us / john_h@deq.state.la.us Louisana Dept. of Env. Quality Env. Technology Division/Toxicological Services Section/ Remediation Services Division and Env. Tech. Divisions of LDEQ	None, the Dept. has promulgated the Risk Evaluation/Corrective Action program (RECAP) allowed under RECAP, although RECAP does not specifically address the subject. LDEQ's Risk Evaluation/Corrective Action Program (RECAP) does not provide specific guidance on the use of bioavailability data in the estimation of chemical intake via the oral or inhalation routes. Bioavailability data may be used in site-specific assessments conducted under the highest level of assessment under	No. At this time, the Department does not have plans to produce guidance on the use of bioavailability data in the assessment of exposure under the RECAP.	There is little guidance available on the subject. U.S. EPA Region ____ Federal U.S. EPA ___X__ Other _____ Not Applicable _____ -Name of reference: Guidelines for Exposure Assessment; Notice. Citation or Document Number: EPA, Federal Register Vol. 57, No. 104, Friday May 29, 1992 -Date of most recent version: Friday May 29, 1992	Bioavailability is largely dependent on the physical/chemical properties of the constituent of concern, therefore, it is expected that the bioavailability, and the methods used to estimate bioavailability, would be different for organics and inorganics.	• Not to my knowledge. • To my knowledge, the Department has not accepted a human health risk assessment that incorporated bioavailability data except for the dermal contact with soil pathway.

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		the RECAP (Management Option 3) if determined to be appropriate for site-specific conditions and approved by the Department. Standard EPA default dermal absorption factors are used in the estimation of chemical intake for the calculation of generic Screening Standards and Management Option 1 RECAP Standards for soil (Table 1 and 2 of RECAP). Under RECAP Management Option 3, the application of bioavailability data shall be in accordance with EPA exposure assessment guidelines and the data shall be accompanied by supporting documentation. -The EPA default dermal absorption factors used in RECAP were obtained from Risk		-Date of next scheduled revision: ? -Name of reference: Risk Assessment Guidance for Superfund Volume I: -Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance -Citation or Document Number: NA -Date of most recent version: November 5, 1998 -Date of next scheduled revision: ?		

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		Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance (EPA 1998). -LDEQ does not have written guidance on the use of bioavailability data. RECAP Table H-1 of Appendix H and Table I-3 of Appendix I present the dermal absorption factors used to develop the RECAP Screening Standards and Management Option 1 RECAP Sandards for soil.				
Maine	Nick Hodgkins 207.287.2651 nick.hodgkins@state.me.us	Emailed survey 03/29/00 - left messege 04/14/00 - called Nick, left voice messege 5/4/00 - 6/26/00 followed up with reminder email				
Maryland	Brian Moffat (410) 631-3493 fax (410) 631-3472 bmoffat@mde.state.m	No.	No plans at this time.	U.S. EPA Region ____ Federal U.S. EPA ____ Other _____ Not Applicable __X__	N/A	No.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	d.us MD Dept. of the Environment Environmental Restoration and Redevelopment Program/Voluntary Cleanup Program					
Massachusetts	John Locke 617.556.1160 Paul.Locke@state.ma.us	Emailed survey 03/29/00 - spoke with Paul 04/14/00, said he would look at survey wouldn't guarantee a response - 6/26/00 called and left message, followed up with reminder email				
Michigan	Christine Flaga, MDEQ/ERD Toxicology Unit P.O. Box 30426 Lansing, MI 48933 (517) 373-0160 fax (517) 373-2637 flagac@state.mi.us Dept. of Environmental Quality Related to the environmental remediation program: Env.	We do not have broad, program-wide language identified anywhere, however, some of the technical support documents (TSDs) and criteria training guidesheets for specific sets of criteria do allow for the use of chemical-specific absorption efficiency values or soil-related characteristics. For example, the TSD for the Part 201 soil direct	No.			Yes, we received a risk assessment for a site called Crego Park where site-specific bioavailability of arsenic in soil was incorporated. A copy of the report is included.

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	Response Division/ Toxicology Unit (other divisions such as Air Quality and Surface Water Quality, have a unique group of risk assessors for their programs)	contact criteria allows for the use of chemical-specific absorption efficiencies for dermal and oral exposures. Other TSDs, like the indoor air criteria TSD and the soil water partitioning criteria TSD, have similar language soil characteristics. These documents can be accessed from the ERD homepage at www.deq.state.mi.us/erd Name of references: • Part 201 Generic Soil Direct Contact Criteria: TSD • Part 201 Generic Soil Inhalation Criteria for Ambient Air: TSD • Part 201 Generic Soil Saturation concentrations: TSD • Part 201 Generic Soil/Water Partitioning Criteria: TSD • Part 201 Generic				

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
		Groundwater and Soil Volatilization to Indoor Air Inhalation Criteria: TSD Citation or Document Number: on ERD homepage as indicated above. Date of most recent version: 31-Aug-98 Date of next scheduled revision: 31-May-00				
Minnesota	Helen Goeden (651) 296-7358 fax (651) 297-7709 helen.goeden@pca.state.mn.us Minnesota Pollution Control Agency Env. Outcomes Division	• Cleanup division has guidance which includes discussion regarding absorption • Name of reference: Risk-based guidance for soil-human health pathway. Volume 2. Technical Support Document • Citation or Document Number: N/A • Date of most recent version: January 1999 • Date of next scheduled revision: no known	No.	U.S. EPA Region ____ Federal U.S. EPA __X__ Other _____ Not Applicable ____ Used for adjusting for bioavailability or absorption differences • Name of reference: RAGS • Date of most recent version: 1989 • Date of next scheduled revision: not known	Default absorption values are different. See Appendix 2 of technical support document.	Specific information regarding bioavailability values deffernt than the agency defaulths has not been submitted. The agency position has been that credible, validated bioavailability/absorption information will be considered. *Note * The guidance document referred to can be found at: www.pca.state.mn.us/cleanup/riskbaseddoc.html

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
						It is located approximalely half-way down the web-page. Also, recommend contacting Minnesota Dept. of Health, Rita Messing- supervisor of the Site Assessment & Consultation Unit. Phone: (651) 215-0924 Fax: (651) 215-0975
Mississippi	Jerry Banks 601.961.5072 jerry_banks@deq.state.ms.us	Emailed survey 03/29/00 - spoke with Jerry Banks on 5/4/00, said he would take a look at survey, email survey to him - 5/18/00 called and left message - 6/26/00 followed up with reminder email				
Missouri	Dave Mosby 573.526.8913 nrmosbd@mail.dnr.state.mo.us	Emailed survey 03/29/00 - called and spoke with Dave Mosby, emailed survey to him 4/19/00 - 6/26/00 followed up with reminder email				
Montana	Tim Aken 406.444.1901	Emailed survey 03/29/00 - called at 10:23 am 03/30/00; transferred to John Beard then to Tim Aken, left a message with his secretary - 5/24/00 got on the internet and looked up other points of contact, emailed to Montana Dept. of Conservation mail@macdnet.org - 6/26/00 followed up with reminder email				

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
Nebraska	Ted Huscher 402.471.3388 fax # (402) 471-2909	Called on 5/2/00, Jeff Kelly no longer works there, spoke with Ted Huscher, will fax survey to him couldn't guarantee a quick turn around, fax # (402) 471-2909 - called 6/26/00 left message				
Nevada	Robert Kelso (702) 687-4670 ext. 3020 fax (702) 687-6396 bkelso@ndep.carson-city.nv.us Division of Env. Protection Bureau of Corrective Actions	No.	No plans for producing guidance documents at this time.	U.S. EPA Region ____ Federal U.S. EPA __X__ Other _____ Not Applicable _____ Name of reference: Risk Assessment Guidance for Superfund (RAGS) Citation or Document Number: EPA/640/R-92/008 Date of most recent version: December 1991 Date of next scheduled revision: unknown	No.	I am not aware of any documents which have incorporated bioavailability. However, we are using risk assessments to assist with our closure decision making.
New Hampshire	David B. Larson (603) 271-4664 (603) 271-3991 dlarson@dhhs.state.nh.us	The State does not have guidance on the use of bioavailability in human health risk assessments.		Until there is guidance from US EPA regarding an approved approach for incorporating/evaluating bioavailability on a case specific basis,		I am not aware of the State accepting a human health risk assessment that incorporates bioavailability data.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	Department of Environmental Services (DES) Department of Health and Human Services Office of Community and Public Health Bureau of Health Risk Assessment (BHRA)			DHHS does not believe it can confidently incorporate bioavailability into a site risk assessment.		
New Jersey	Linda J. Cu llen (609) 984-9778 (609) 292-0848 lcullen@dep.state.nj.us New Jersey Department of Environmental Protection Environmental Toxicology and Risk Assessment Unit (ETRA) of the Site Remediation Program (SRP)	The Site Remediation Program does not require human health risk assessments as part of its program. The Department has developed cleanup criteria and a methodology to meet those criteria as outlined in the Technical Requirements for Site Remediation. Both criteria and requirements are available on NJDEP's Website: www.state.nj.us/dep/srp . As part of the development of soil cleanup criteria, there	The NJDEP is a member of a research oversight group, Solubility/Bioavailability Research Coalition (SBRC) that includes EPA, industry, academia, and consultants. The key objective is to develop, validate, and standardize an *in vitro* test for estimating the bioavailability of inorganic elements from soil, resulting in accurate estimates of human health risk, and more realistic site-specific cleanup criteria. For detailed information on the	The SRP is unaware of any ongoing efforts or documents regarding the appropriate use of bioavailability in risk assessment or in the development of cleanup criteria/standards in the Regions, EPA or elsewhere. With the exception of EPA's IEUBK model for lead, which incorporates a default value for lead bioavailability in the model, the Department is unaware of remediation programs that use bioavailability in the development of generic cleanup criteria	The Coalition is working on only inorganics at this time.	The DEP is not aware of the use of bioavailability in the development of a human health risk assessment or the development of generic cleanup criteria by this state or regional site remediation programs.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
		is the option to develop site-specific alternate cleanup criteria. Bioavailability is expected to be an option in the development of alternate site-specific cleanup criteria, however, the methodology is not yet developed. Currently, the SRP does not have any written guidance on the use of bioavailability in conducting human health risk assessments or in the development of cleanup criteria.	project, contact Michael Ruby at Exponent Environmental Group at (313) 444-7270 or rubym@exponent.com.	or in site-specific alternate cleanup criteria.		
New Mexico	George Schuman (505) 827-0072 fax (505) 827-2965 george_schuman@nmenv.state.nm.us New Mexico Environment Dept. (NMED) Several bureaus deal with human health risk assessments; I	To my knowledge, the NMED has not issued guidance on the use of bioavailability estimates in human health risk assessments.	I am not aware of any plans to produce guidance on the use of bioavailability estimates.	The NMED Ground Water Quality Bureau confers with EPA Region 6 risk assessors on this issue as necessary.	N/A	I am not aware of any human health risk assessments accepted by the NMED Ground Water Quality Bureau that used site-specific bioavailability data.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	work for the Ground Water Quality Bureau, which works on federal Superfund sites and sites being investigated and remediated under state-lead agreements.					
New York	Jim Harrington, Chief Technology Section (518) 457-0337 (p) (518) 457-9639 (f) jbharrin@gw.dec.state.ny.us Division of Env. Remediation New York State Dept. of Env. Conservation	NYS does not have any written guidance on the use of bioavailability in conduction human health risk assessments. Human health risk assessments follow EPA RAGS.	I am not aware that the agency has plans to develop said guidance	I am not aware of any guidance that incorporates chemical specific bioavailability into the risk assessment process.	N/A	NO. To my knowledge, no one has ever proposed the use of chemical specific bioavailability in a risk assessment.
North Carolina	David Lilley, CIH, CSP (919) 733-2801, ext. 286 fax (919) 733-4811 David.Lilley@ncmail.net North Carolina	no, the state has no written guidance on the use of bioavailability data in human health risk assessments	no, the state has no guidance and no plans for producing guidance on the use of bioavailability data in human health risk assessments	The state does not consider the use of bioavailability in human health risk assessments.	The state does not consider different methodologies for organics and inorganics in relation	no, I am not aware of the state accepting a human health risk assessment that incorporated bioavailability data

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	Division of Waste Management/Superfund Section				to the use of bioavailability data in human health risk assessments	
North Dakota	Robert Disney (701) 328-5166 rdisney@state.nd.us ND Division of Waste Management Same as environmental agency	No.	No.	Yes. U.S. EPA Region ____ Federal U.S. EPA ____ Other __X___ Not Applicable _____ Name of reference: Human Exposure based on specific site risk assessment. Citation or Document Number: None	No.	No.
Ohio	Ed Pfau, Ohio EPA Voluntary Action Program (VAP) (614) 644-2295 fax (614) 644-3146 Ed.Pfau@epa.state.oh.us Ohio EPA Voluntary Action Program	The Ohio EPA/VAP does not have any written guidance on bioavailability guidance for use in human health risk assessments. However, gastrointestinal absorption was considered in the	The Ohio EPA/VAP has no scheduled bioavailability guidance planned.	The Ohio EPA/VAP does not have any standard default guidance documents with specific reference to bioavailability, although general reference documents with respect to general risk assessment practices are cited in	N/A	Considerations of bioavailability may be incorporated in to a Property-specific risk assessment in accordance with the procedures in Paragraph (D)(3)(b)(iv) of Rule 3745-300-09 of the OAC, which was also

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	(VAP) Each program area is responsible for the development of risk assessment rules and guidance, and for reviewing and implementing risk assessment for its program. The divisions and programs which are most involved in risk assessment review and development include the Division of Emergency and Remedial Response (Voluntary Action Program (VAP); Remedial Enforcement Program); the Division of Hazardous Waste Management (DHWM, the state-implemented RCRA program); the Division of Air Pollution Control (DAPC) and the Division of Surface	development of the industrial lead standard, and for the development of dermal reference doses and dermal slope factors derived from route-to-route extrapolation from oral reference doses and oral slope factors based on administered dose studies, respectively. These GI absorption values are discussed in the VAP "Support Document for the Development of Generic Numerical Standards and Risk Assessment Procedures" (revised October 1996), which may be downloaded from the Ohio EPA VAP web page at: http://www.epa.state.oh.us/derr/vap/guidance/guidance.html Name of reference: Support Document for the Development of Generic		the VAP Property-Specific Risk Assessment Procedures Rule, which is Rule 3745-300-09 of the Ohio Administrative Code (OAC) which may be viewed, printed or downloaded at: http://www.epa.state.oh.us/derr/vap/rules/Vaprules.html		cited in the answer to #3, above.

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	Water (DSW). Additionally, risk assessment practices for the assessment of petroleum underground storage tanks is administered by the Ohio Department of Commerce's Bureau of Underground Storage Tank Regulations (BUSTR). Please find below the following contacts for these programs: Ohio EPA/DERR/VAP: Ed Pfau (see contact information above) Ohio EPA/DERR/Remedial Enforcement: Mr Brian Tucker phone 614-644-3120 e-mail: Brian.Tucker@epa.state.oh.us Ohio EPA/DHWM: Ms Stephanie Beak Phone: 614-644-	Numerical Standards and Risk Assessment Procedures Citation or Document Number: none Date of most recent version: October 1996 Date of next scheduled revision: (unscheduled)				

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	4852 e-mail: Stephanie.Beak@epa.state.oh.us Ohio EPA/DAPC: Mr Paul Koval phone: 614-644-3615 e-mail: Paul.Koval@epa.state.oh.us Ohio EPA/DAPC: Ms Diane McClure phone: 614-644-4835 e-mail: Diane.McClure@epa.state.oh.us Ohio EPA/DSW: Mr Robert Heitzman phone: 614-644-3075 e-mail: Bob.Heitzman@epa.state.oh.us Ohio Dept. of Commerce/BUSTR: Mr Ray Ladrick phone: 614-752-7938 Ray.Ladrick@com.state.oh.us Ohio Dept. of Commerce/BUSTR: Mr Brian Tarver					

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	phone: 614-752-7938 Brian.Tarver@com.state.oh.us					
Oklahoma	Derek R. Smithee (405) 530-8800 fax (405) 530-8900 DRSmithee@owrb.state.ok.us Oklahoma Water Resources Board Oklahoma Water Resources Board/Water Quality Programs Division for Water Unknown for other media Mr. Scott Thompson with the Department of Environmental Quality, superfund activities (405) 702-8100.	None for soils. Yes for bioavailablity in water in the development of water quality criteria in Oklahoma's Water Quality Standards. Will provide on request.	No.		In water, different for carcinogenic and non-carcinogenic	No.
Oregon	Bruce Hope (503) 229-6251 fax (503) 229-6954 hope.bruce@deq.state.or.us	It can be considered on a site-specific basis but there are no specific guidelines on how to do this.	No plans to produce.	We generally default to a number of EPA guidance documents but not necessarily specifically for bioavailability.	N/A	Not aware of any.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	Department of Environmental Quality Division Env. Cleanup Division					
Pennsylvania	Samuel Fang (717)783-9481 fax (717) 787-0884 fang.samuel@dep.state.pa.us Pennsylvania Dept. of Env. Protection Land Recycling Program	No.	N/A	U.S. EPA Region __3__ Federal U.S. EPA __X__ Other _____ Not Applicable _____ • Name of reference: Appendix A of EPA RAGS, Volume I, Part A and EPA Region III Technical Guidance Manual Risk Assessment – Assessing Dermal Exposure from Soil • Citation or Document Number: EPA/540/1-89/002 and EPA/903-K-95-003 • Date of most recent version: December 1989 and Dec. 1995 • Date of next scheduled revision:	Yes, different absorption factors.	N/A

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				Unknown		
Rhode Island	Richard T. Enander/ Kelly Owens (401) 222-4700 ext. 4411/ (401) 222-2797 ext. 7108 kowens@dem.state.ri.us Dept. of Env. Management Office of Waste Management	No written guidance at this time.	No near future plans.	U.S. EPA Region __X__ Federal U.S. EPA __X__ Other _____ Not Applicable _____ • USEPA Risk Assessment Guidance for Superfund, HHEM • USEPA Guidelines for Exposure Assessment • USEPA Dermal Exposure Assessment Principals & Applications	N/A	Per 4/26/00 communication with S. Rembish, Parsons Engineering Science, not aware of any sites in Rhode Island that have used sit-specific bioavailability data based on "in vitro" or animal bioassays using contaminated site media.
South Carolina	Don Siron, Heather Kaufelds, Gale Jeter 803.896.4069 Sirondl@columb34.dhec.state.sc.us, Kaufelhf@columb34.dhec.state.sc.us					
South Dakota	Mark Lawrensen	No.	No plans in the near future to produce	U.S. EPA Region __X__	N/A	Not aware if have accepted.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	(605) 773-5868 fax (605) 773-6035 Mark.Lawrensen@state.sd.us Dept. of Env. and Natural Resources Division of Env. Services		guidance.	Federal U.S. EPA __X__ Other __X__ Not Applicable _____		
Tennessee	Charles Jobe 615.532.0932 jobe.nash10@worldnet.att.net	Emailed survey 03/29/00 - called 5/2/00, no answer - 5/24/00 got on the internet looked up another point of contact, emailed survey to environment@mail.state.tn.us; - 6/26/00 followed up with a reminder email				
Texas	Torin McCoy 512.239.1572 tmccoy@tnrcc.state.tx.us	Texas Risk Reduction Program Rule and Preamble, 30 TAC 350.74 (j)(1)(C), 24 TexReg 7623-4, 9/23/99, unknown revision date	Guidance will likely be developed in order to clarify the rule and expectations. The guidance should be completed by year end 2000.	U.S. EPA Region _____ Federal U.S. EPA _____ Other _____ Not Applicable __X__	Issue to be addressed in guidance.	N/A – Guidance issures still pending.
Utah	Scott Everett (801) 536-4117 fax (801) 359-8853 Severett@DEQ.state.ut.us Utah Department of Environmental Quality	No.	Not at this time.	U.S. EPA Region __8__ Federal U.S. EPA _____ Other _____ Not Applicable _____	Not Known	UDEQ has looked at bioavailability information in decisions regarding inorganic wastes (particularly Lead and Arsenic) at CERCLA sites.

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
	Division of Environmental Response and Remediation and Division of Solid and Hazardous Waste					
Vermont	George Desch (802) 241-3491 fax (802) 241-3296 georged@dec.anr.state.vt.us Vermont Agency of Natural Resources Dept. of Env. Conservation, Waste Management Division, Sites Management Section, with assistance from Vermont Dept. of Health	N/A	No plans to produce in the near future.	U.S. EPA Region ____ Federal U.S. EPA ____ Other __X__ Not Applicable _____ The VT DOH advises us on the bioavailability criteria, if applicable, for specific contaminants of concern.	Not aware.	Not aware.
Virginia	Pat McMurray (804) 698-4186 fax (804) 698-4234 pamcmurray@deq.state.va.us	No.	No current plans.	No.		To the best of my knowledge we have not.

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	Dept. of Env. Quality Office of Remediation Programs, Division of Waste Program Coordination					
Washington	Tom Greason 306.407.7177 tgri461@ecy.wa.gov	Emailed survey 03/29/00 - called 5/2/00, left messege with Tom Greason, will be out of the office today and tomorrow; Tom returned call on 5/5/00 said he would take a look at survey followed up with reminder email 6/28/00				
West Virginia	David Hight/ Ken Ellison (304) 558-2508 fax (304) 558-3998 dhight@mail.dep.state.wv.us/ kellison@mail.dep.state.wv.us Division of Env. Protection Office of Env. Remediation	Yes, • Name of reference: Guidance Manual • Citation or Document Number: Version 1.1 • Date of most recent version: 1999 • Date of next scheduled revision: Summer 2000				A copy of the Guidance Manual for the West Virginia Voluntary Remediation Program is attached. Bioavailability and absorption factors are discussed in Appendix E. We do not yet have any Risk Assessments which discusses or use bioavailability but will have at least one in the next several months.
Wisconsin	Rhonda Maronn 608.266.5425 mccurc@dnr.state.wi.us	Emailed survey 4/20/00 - spoke with Rhonda Maronn 5/2/00, said she would take a look at the survey and forward it on, emailed survey to maronr@dnr.state.wi.us - 6/26/00 followed up with reminder email				

Name of Common-wealth	*Contact Person / Phone # / Fax # / email / agency / division or branch*	*Question 1*	*Question 2*	*Question 3*	*Question 4*	*Question 5*
Wyoming	Carl Anderson (307) 777-7752 fax (307) 777-5973 cander@state.wy.us Dept. of Env. Quality Haz Waste Permitting/Corrective Action program	No.	No plans.	State has not been presented with use of bioavailability, but if /when this happens would rely on available EPA guidance, including regional guidance.	N/A	To date, the state has not been presented with a HHRA with bioavailability data incorporated.